

Amendments to the Specification:

Please amend the Title to read:

REPRODUCING APPARATUS

Please insert the following paragraphs on page 5, after line 17:

The first present invention is a reproducing apparatus, comprising:

a reproducing unit that extracts, from a recording medium in which signals that have same contents but are compressed in a plurality of different conditions, and record management information that denotes a mutual association between said signals that have the same contents but are compressed in a plurality of different conditions are recorded, respectively, any of said signals;

a decoding unit that decodes any of said signals extracted from said recording medium; and

a recording unit that records, in correspondence to said record management information, reproduction management information including reproduction middle information that denotes middle of a reproduction of signals from said recording medium.

The second present invention is the reproducing apparatus according to the first present invention, wherein said recording unit records said reproduction management information on said recording medium.

The third present invention is the reproducing apparatus according to the first present invention, further comprising a built-in flash memory,

wherein said reproduction management information is recorded on said flash memory.

_____ The fourth present invention is the reproducing apparatus according to the third present invention, wherein said reproducing unit further extracts said reproduction management information from said flash memory, and based on said record management information and said reproduction management information, extracts, from said recording medium, signals after signals corresponding to said reproduction middle information included in said reproduction management information.

_____ The fifth present invention is the reproducing apparatus according to any one of the first to the fourth present inventions, wherein said reproduction middle information concerns elapsed time from start of reproduction of said signal.

_____ The sixth present invention is the reproducing apparatus according to the third present invention, wherein said recording unit further records, in correspondence to said record management information and said reproduction management information, identification information of said recording medium on said flash memory.

_____ The seventh present invention is the reproducing apparatus according to the sixth present invention,

_____ wherein said reproducing unit further extracts said record management information, said reproduction management information, and said identification information of said recording medium,

_____ any of signals extracted from said recording medium is suitable for said reproducing unit and/or said decoding unit, and

_____ said reproducing unit, based on said record management information, said reproduction management information, and said identification information of said recording medium, further extracts, from said recording medium, signals after signals corresponding to said reproduction middle information included in said reproduction management information.

_____ The eighth present invention is the reproducing apparatus according to the first present invention, wherein said different conditions concern different bit rates, different

numbers of pixels, or different compression methods.

The ninth present invention is the reproducing apparatus according to the first present invention, wherein said signals that have the same contents but are compressed in a plurality of different conditions are recorded on said recording medium so that each of said signals can be continuously reproduced.

The tenth present invention is the reproducing apparatus according to the first present invention, wherein said signals that have the same contents but are compressed in a plurality of different conditions are recorded respectively in continuous data areas, each of which has size that is equal to or larger than a predetermined size.

The eleventh present invention is the reproducing apparatus according to the tenth present invention,

wherein said recording medium is an optical disc, a magneto-optical disc, or a magnetic disc,

said reproducing unit has a head for reading a signal from said recording medium, and

said predetermined size is expressed by the following equation:

(equation 1)

$V_o \times T_j \times V_r / (V_r - V_o)$

(V_o : data transfer rate to said decoding unit (Mbps), T_j : maximum seek time of said head (second), V_r : data-reading rate of each of said signals from said recording medium by said head (Mbps)).

The twelfth present invention is the reproducing apparatus according to the first present invention,

wherein said signals that have the same contents but are compressed in a plurality of different conditions are recorded respectively in continuous data areas, each of which has size that is equal to or larger than a predetermined size, and

said continuous data areas are recorded in a form of being repeatedly alternately arranged.

The thirteenth present invention is the reproducing apparatus according to the tenth or the twelfth present inventions, wherein said signals compressed in a plurality of different conditions that are recorded in the continuous data areas, each of which has size that is equal to or larger than the predetermined size, have same reproduction time.

The fourteenth present invention is the reproducing apparatus according to the twelfth present invention, wherein said decoding unit further decodes signals compressed in a plurality of different conditions that are extracted from said recording medium.

The fifteenth present invention is the reproducing apparatus according to the eighth present invention, wherein said different compression methods are MPEG2 and MPEG4, respectively.

The sixteenth present invention is a recording apparatus, comprising:

a recording unit that records, on a recording medium, signals that have same contents but are compressed in a plurality of different conditions, and record management information that denotes a mutual association between said signals that have the same contents but are compressed in a plurality of different conditions;

a reproducing unit that extracts a signal recorded on said recording medium; and

a decoding unit that decodes a signal extracted from said recording medium,

wherein said recording unit records said signals that have the same contents but are compressed in a plurality of different conditions, respectively, in continuous data areas, each of which has size that is equal to or larger than a predetermined size, and records said

continuous data areas on said recording medium in a form of being repeatedly alternately arranged.

The seventeenth present invention is the recording apparatus according to the sixteenth present invention,

wherein said recording medium is an optical disc, a magneto-optical disc, or a magnetic disc,

said reproducing unit has a head for reading a signal from said recording medium, and

said predetermined size is expressed by the following equation:

(equation 1)

$$Vo \times Tj \times Vr / (Vr - Vo)$$

(Vo: data transfer rate to said decoding unit (Mbps), Tj: maximum seek time of said head (second), Vr: data-reading rate of each of said signals from said recording medium by said head (Mbps)).

The eighteenth present invention is a recording and reproducing system, comprising:

a reproducing unit that extracts, from a recording medium in which signals that are compressed in a plurality of different conditions, and record management information that denotes a mutual association between said signals that are compressed in a plurality of different conditions are recorded, respectively, any of said signals;

a decoding unit that decodes any of said signals;

a transmitting unit that transmits any of said signals; and

a remote decoding unit that decodes said transmitted signal,

wherein said reproducing unit outputs said extracted signal to said decoding unit or said transmitting unit, and records, in correspondence to said record management information, reproduction management information including reproduction middle information with regard to decoding in said decoding unit or said remote decoding unit.

The nineteenth present invention is the recording and reproducing system according to the eighteenth present invention, wherein said reproducing unit can transmit said extracted signal to said remote decoding unit, and in said transmission, based on said record management information and said reproduction management information, transmits signals after signals corresponding to said reproduction middle information included in said reproduction management information.

The twentieth present invention is a reproducing method, comprising the steps of:

extracting, from a recording medium in which signals that have same contents but are compressed in a plurality of different conditions, and record management information that denotes a mutual association between said signals that have the same contents but are compressed in a plurality of different conditions are recorded, respectively, any of said signals;

decoding any of said signals extracted from said recording medium; and

recording, in correspondence to said record management information, reproduction management information including reproduction middle information that denotes middle of a reproduction of signals from said recording medium.

The twenty-first present invention is the reproducing method according to the twentieth present invention,

wherein the step of recording, in correspondence to said record management information, said reproduction management information means a step of recording, in correspondence to said record management information, said reproduction management information on a flash memory.

the reproducing method further comprising the steps of:

extracting said reproduction management information from said flash memory, and

based on said record management information and said reproduction management information, extracting, from said recording medium, signals after signals corresponding to said reproduction middle information included in said reproduction management information.

The twenty-second present invention is a program that causes a computer to perform functions as the reproducing unit that extracts, from said recording medium, any of said signals, the decoding unit that decodes any of said signals extracted from said recording medium, and the recording unit that records, in correspondence to said record management information, said reproduction management information, of the reproducing apparatus according to the first aspect of the present invention.

The twenty-third present invention is a program that causes a computer to perform functions as the reproducing unit that extracts said reproduction management information from said flash memory, and based on said record management information and said reproduction management information, extracts, from said recording medium, signals after signals corresponding to said reproduction middle information included in said reproduction management information, of the reproducing apparatus according to the fourth aspect of the present invention.

The twenty-fourth present invention is a recording medium that stores the program according to the twenty-second or the twenty-third present invention, and is computer-executable.

The twenty-fifth present invention is a data structure, wherein signals having same contents are compressed in a plurality of different conditions and are independently recorded on a recording medium, the data structure being capable of recording record management information that denotes a mutual association between said signals that have the same contents but are compressed in a plurality of different conditions, and reproduction management information including reproduction middle information that

denotes middle of reproduction of signals from a recording medium, in correspondence to said record management information.

Please replace the paragraph, beginning at page 5, line 18, with the following rewritten paragraph:

To solve the above problems, the first aspect of the ~~present~~-invention is a reproducing apparatus comprising:

Please replace the paragraphs, beginning at page 6, line 9, with the following rewritten paragraphs:

The second aspect of the ~~present~~ invention is the reproducing apparatus according to the first aspect of the ~~present~~-invention, wherein said reproduction-interruption information is elapsed time from start of reproduction of said signal.

The third aspect of the ~~present~~-invention is the reproducing apparatus according to the first aspect of the ~~present~~-invention, which is driven by a battery.

The forth aspect of the ~~present~~-invention is the reproducing apparatus according to the first aspect of the ~~present~~-invention, which is suitable for displaying a signal decoded from the signal compressed in MPEG2.

The fifth aspect of the ~~present~~-invention is a reproducing apparatus comprising a reproducing section picking up any of signals compressed in a plurality of different compression methods, record management information denoting each other's association of said signals compressed in the plurality of different compression methods, and said reproduction management information recorded by the reproducing apparatus according to the first aspect of the ~~present~~-invention from a recording medium which records said signals compressed in the plurality of different compression methods, said record management information, and said reproduction management information, respectively; and

Please replace the paragraph, beginning at page 7, line 19, with the following rewritten paragraph:

The sixth aspect of the ~~present~~-invention is the reproducing apparatus according to the fifth aspect of the ~~present~~-invention, wherein said plurality of different compression methods are MPEG2 and MPEG4,

Please replace the paragraphs, beginning at page 8, line 1, with the following rewritten paragraphs:

a compression method for said signal subsequent to the signal corresponding to said reproduction-interruption information is different from a compression method for the signal that reproduced by the reproducing apparatus according to the first aspect of the ~~present~~ invention.

The seventh aspect of the ~~present~~-invention is a recording apparatus which records signals compressed in a plurality of different compression methods and record management information denoting each other's association of said signals compressed in a plurality of different compression methods onto a recording medium.

The eighth aspect of the ~~present~~-invention is the recording apparatus according to the seventh aspect of the ~~present~~-invention, wherein said recording section records said signal compressed in MPEG2 and said signal compressed in MPEG4 as alternatively aligned stream onto said recording medium.

The ninth aspect of the ~~present~~-invention is the recording apparatus according to the eighth aspect of the ~~present~~-invention, wherein said signal stream compressed in MPEG2 including at least a first predetermined continuous data area is recorded onto said recording medium, and said signal stream compressed in MPEG4 including at least a second predetermined continuous data area is recorded onto said recording medium.

The tenth aspect of the ~~present~~-invention is the recording apparatus according to the ninth ~~present~~-invention, wherein said recording medium is an optical disc or a magnetic disc, and the reproducing section of the reproducing apparatus picking up the signal recorded on said recording medium according to the first or the fifth aspect of the ~~present~~-invention includes a head picking up the signal from said recording medium,

Please replace the paragraphs, beginning at page 9, line 18, with the following rewritten paragraphs:

The eleventh aspect of the ~~present~~-invention is the recording apparatus according to the tenth aspect of the ~~present~~-invention, wherein said recording section records said signal stream compressed in MPEG2 and said signal stream compressed in MPEG4 onto said recording medium so that time for reproducing said signal stream compressed in MPEG2 equals to time for reproducing said signal stream compressed in MPEG4 in said reproducing section.

The twelfth aspect of the ~~present~~-invention is a recording and reproducing method comprising steps of recording signals compressed in a plurality of different compression methods and record management information denoting each other's association of said signals compressed in the plurality of different compression methods onto a recording medium;

Please replace the paragraphs, beginning at page 11, line 2, with the following rewritten paragraphs:

wherein said signal subsequent to the signal corresponding to said reproduction-interruption information is suitable for said ~~reproducing~~-picking up step and/or said decoding step.

The thirteenth aspect of the ~~present~~-invention is a program for causing a computer to perform as a reproducing section picking up said any of signals and a decoding section for decoding said signal picked up from the recording medium in the reproducing apparatus according to the first aspect of the ~~present~~-invention.

The fourteenth aspect of the ~~present~~ invention is a program for causing a computer to perform as a reproducing section picking up said any of signals, said record management information, and said reproduction management information from the recording medium; and a decoding section for decoding said signal picked up from the recording medium in the reproducing apparatus according to the fifth aspect of the ~~present~~-invention.

The fifteenth aspect of the ~~present~~-invention is a recording medium executable by a computer storing the program according to the thirteenth or the fourteenth aspect of the ~~present~~-invention.

The sixteenth aspect of the ~~present~~-invention is a data structure capable of recording signals compressed in a plurality of different compression methods separately, and of recording management information denoting association of said signals compressed in a plurality of different compression methods with each other and reproduction-interruption information associated with said management information in reproduction.

Please replace the paragraph, beginning at page 28, line 6, with the following rewritten paragraph:

Additionally, the file entry manages the ~~contiguous-continuous~~ data areas (CDAs) a, b, and c, which store data, with an allocation descriptor. Concretely, when detecting a bad logic block during recording into the ~~contiguous-continuous~~ data area a, the recording control section 341 skips said logic block and continues to write from the top of the ~~contiguous-continuous~~ data area b. Next, when detecting a conflict with a record area of the PC file during recording into the ~~contiguous-continuous~~ data area b, the recording control section 341 skips said logic block and continues to write from the head of the ~~contiguous-continuous~~ data area c. Consequently, the file VR_MOVIE.VRO consist of the ~~contiguous-continuous~~ data areas a, b, and c.

Please replace the paragraphs, beginning at page 30, line 9, with the following rewritten paragraphs:

In addition, several bad logic blocks may be included in the continuous data area. However, in this case, it is necessary to reserve a bit more than 11 seconds of the continuous data area ~~additionally needs a certain amount area other than 11 seconds of area~~ for additional time necessary to read the bad logic blocks in reproduction.

To generalize the above explanation, the minimum size of the continuous data area is represented by

[Equation 2]

$$\text{Minimum Size of Continuous Data Area} = V_o \times T_j \times V_r / (V_r - V_o)$$

where T_j (second) is the maximum seek time of the pickup 130, V_o (Mbps) is a data-output rate of ~~to the pickup 130~~ MPEG2 decoding section, and V_r (Mbps) is a data-reading rate of the pickup 130. Here, V_o and V_r vary according to MPEG2 and MPEG4. A first predetermined continuous data area according to the present invention and a second predetermined continuous data area according to the present invention, which are the minimum size of adequate continuous data area, are determined for the respective compression methods. Additionally, Fig. 11 shows the relationship of the above equation. Since the continuous data area is determined as mentioned above, it is possible to pick up each part of data without freezing even in the case that two video streams are alternatively recorded as shown in Fig. 12.

Please replace the paragraph, beginning at page 32, line 20, with the following rewritten paragraph:

When the data size of each continuous data area satisfies the above equation, physically continuous location is not necessary as shown in Fig. 13. However, in order to continuously play the video and audio without freezing, it is necessary that the first continuous data area (CDA) is provided in the case of MPEG2, and that the second continuous data area is provided in the case of ~~MPEG2~~ MPEG4, and that respective files in these continuous data areas are performed physically continuous recording. Accordingly, seeking operation of the pickup 130 for recording two files in parallel can be reduced.

Please replace the paragraph, beginning at page 36, line 3, with the following rewritten paragraph:

In addition, the reproduction-interruption information ~~of 3~~ is recorded onto a recording disc such as the DVD-RAM 131 in this embodiment, however, it may be recorded on a flash memory installed in the AV data recording and reproducing apparatus. In this case, it is necessary to record a media identifier with an identifier, in order to identify which recording medium is interrupted playing.